

What is claimed are:

1. A switching power source comprising a DC power source; a primary winding of a transformer and a switching element connected in series to the DC power source; a current detector for acquiring electric current flowing through the primary winding of the transformer or the switching element; a rectifying smoother connected to a secondary winding of the transformer for generating DC output voltage; and a control circuit for supplying the switching element with drive signals to turn the switching element on and off so as to keep the DC output voltage in a substantially constant level;

said control circuit comprising a current comparator for comparing a voltage level of signals acquired by the current detector with a reference voltage level to produce detection signals of first or second level;

an edge detector for sensing an edge of drive signal supplied to a control terminal of the switching element during the period of transition from turning on to off of the switching element; and

a decision means for receiving a current detection signal from the current comparator to produce an output signal when the edge detector catches an edge of drive signal;

wherein the decision means produces the different output signals of respectively first and second voltage levels under the light load condition and non-light load conditions heavier than light load.

2. The switching power source of claim 1, wherein the control circuit comprises an oscillation controller which reduces the oscillation frequency of drive signals when the decision means produces the output signal of the first voltage level, and adversely, increases the oscillation

frequency of drive signals when the decision means produces the output signal of the second voltage level.

3. The switching power source of claim 1 or 2, wherein the control circuit comprises a voltage adjuster which either controls the reference voltage level of the current comparator in the same direction as the movement of peak voltage value of detection signal by the current detector or controls the voltage level of the detection signal in the opposite direction from the movement of peak voltage value of detection signal by the current detector, when the decision means changes the voltage level of the output signal.

4. The switching power source of any one of claims 1 to 3, wherein the control circuit comprises a bottom voltage detector for detecting a minimum level of the voltage between main terminals of the switching element during the off period thereof; and a skip controller which turns the switching element on in response to a first minimum level of the voltage detected by the bottom voltage detector when the decision means produces the output signal of the second voltage level, otherwise, turns the switching element on in response to a second or later minimum level detected by the bottom voltage detector when the decision means produces the output signal of the first voltage level.

5. The switching power source of claim 4, wherein the bottom voltage detector comprises a wave forming means for transforming, into pulse arrays, ringing voltages produced on a drive winding of the transformer during the off period of the switching element, and the bottom voltage detector may find a rising edge of the pulse array voltage as a

minimum level of the voltage across the switching element.

6. The switching power source of any one of claims 1 to 5, further comprising: a plurality of current comparators, a plurality of edge detectors and a plurality of decision means wherein the current comparators compare a detection signal by current detector with levels of different reference voltages to reduce oscillation frequencies of drive signals to different frequencies by output signals of the first voltage level outputs from the plurality of decision means.

7. The switching power source of claim 1 or 7, wherein the control circuit comprises an intermittent oscillation controller for suspending the on-off operation of the switching element for a given period of time sufficiently longer than an oscillation cycle of the drive signals when the decision means produces the output signal of the first voltage level.

8. The switching power source of any one of claims 1 to 7, wherein the edge detector and decision means comprises D-flip flops.

9. The switching power source of any one of claims 1 to 8, further comprising a trigger means connected to the DC power source for supplying the control circuit with drive power; a drive winding electro-magnetically connected to the primary and secondary winding of the transformer; and an auxiliary rectifying smoother connected to the drive winding for supplying the control circuit with DC power.

10. The switching power source of any one of claims 1 to 8, further comprising a control power circuit connected to the DC power source for

supplying the control circuit with drive power.

11. The switching power source of any one of claims 1 to 10, wherein the switching element comprises a shunt for dividing electric current flowing through a closed circuit inclusive of the primary winding; the current detector detects electric current divided by the shunt.